

PLAN Series™

General Information Manual

NESTAR





NESTAR SYSTEMS INCORPORATED

PLAN Series TM



GENERAL INFORMATION MANUAL



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WARNING

This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the manufacturer's instructions, it may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

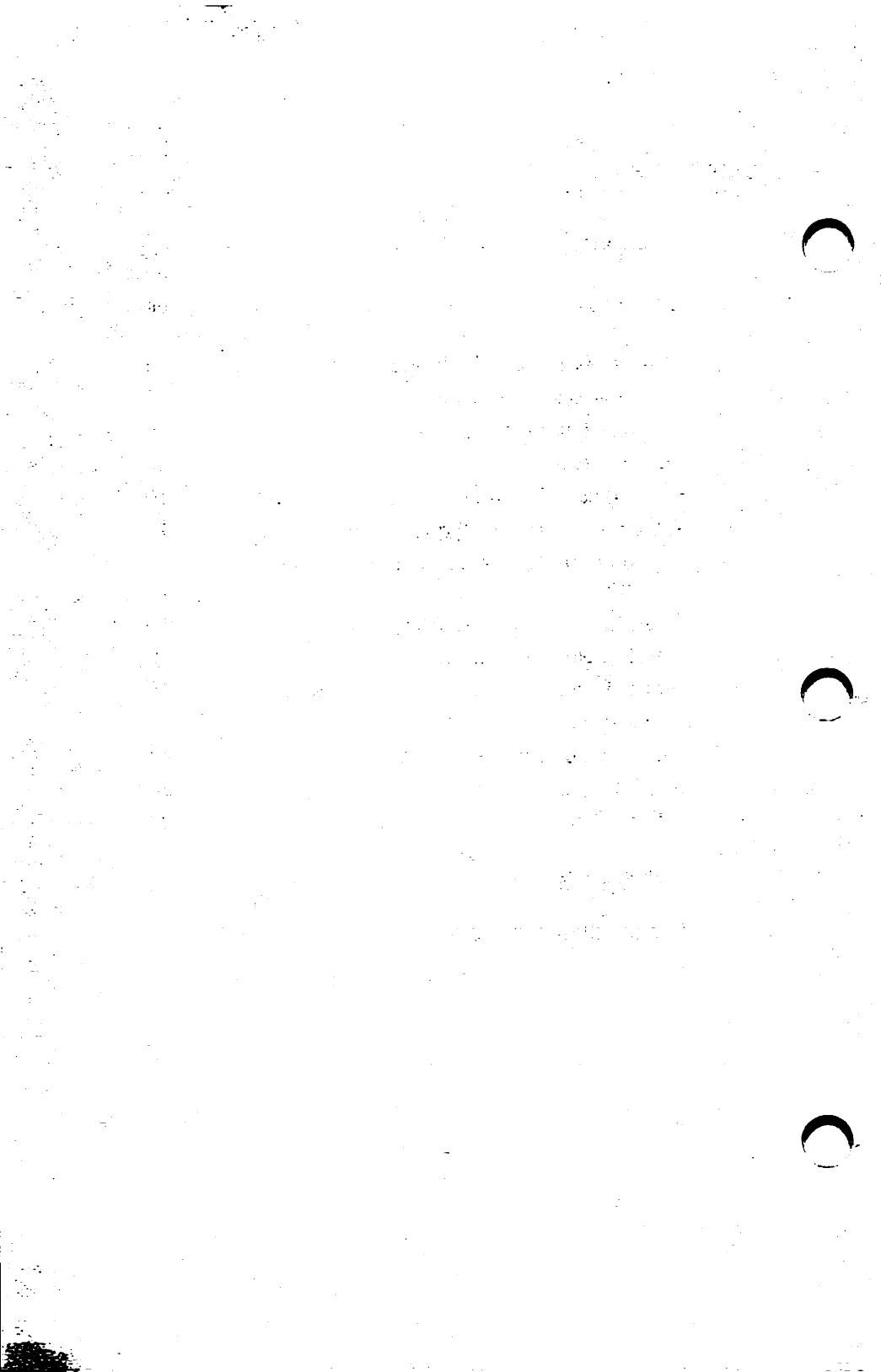
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Publication number GA40-0100-3
February 1, 1986

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The PLAN Series: An Introduction

The PLAN Series offers a set of fast, expandable, local area computer networks. Connecting a variety of desktop workstations, these networks allow users to communicate with each other and to share data, mass storage, and other network resources.

Recent advances in computers have multiplied the power of desktop systems. At the same time computer networking has grown more sophisticated. The PLAN Series merges these two technologies, providing a business environment that answers current corporate needs for widespread computer use by employees.

In business a wide spectrum of individuals must share information; rarely is true "personal" data encountered in corporate situations. One person might enter the basic data, another edit or modify it, and a third produce reports or graphic displays from it. Many sources supply the information, but it must be merged, managed, and distributed to be useful. Also, because information is a valuable resource, it must be protected from malicious or accidental misuse.

Traditional multiuser computer systems, whether mainframe or minicomputer, are not well suited to this new type of automated application. Conventional systems require large, centralized facilities inaccessible to the user. They require costly support staffs. Maintenance problems make it difficult to justify new development, resulting in today's widespread applications backlog.

Conventional systems also lack the responsiveness, ease of use, and user orientation of the newer desktop systems. They expect a more sophisticated, trained user, decreasing their usefulness to the far broader class of new computer users.



The Network Community

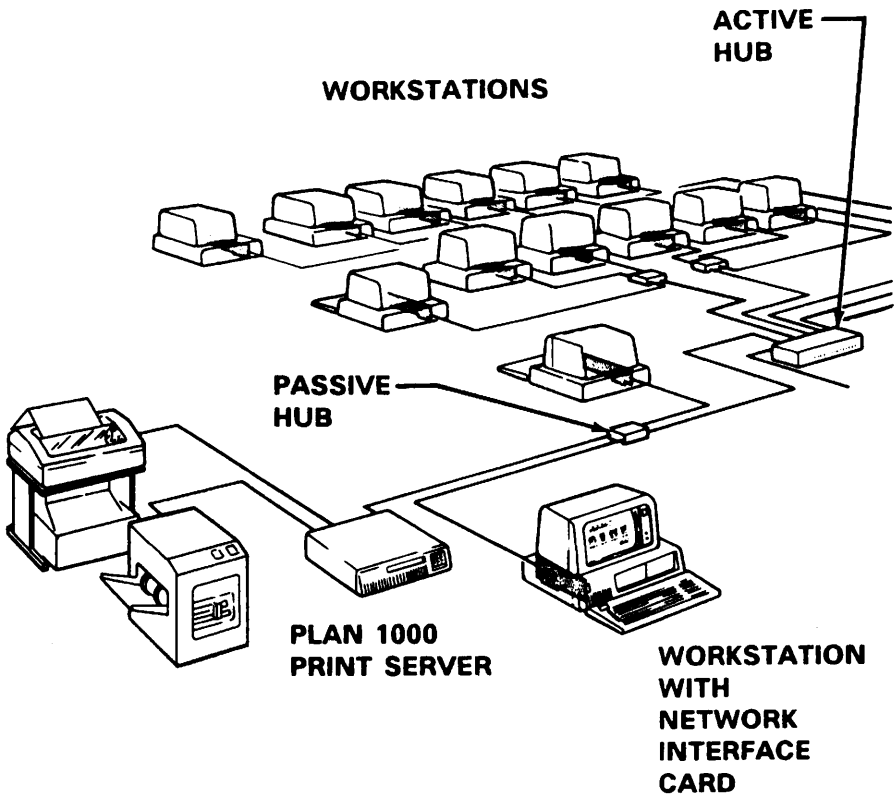
Personal Local Area Networks (PLANs) use familiar personal computers as desktop workstations. The computers retain all of their standalone capabilities; in addition they can connect automatically to the network at startup, and users can obtain services from elsewhere on the network as easily as they can from their own workstation.

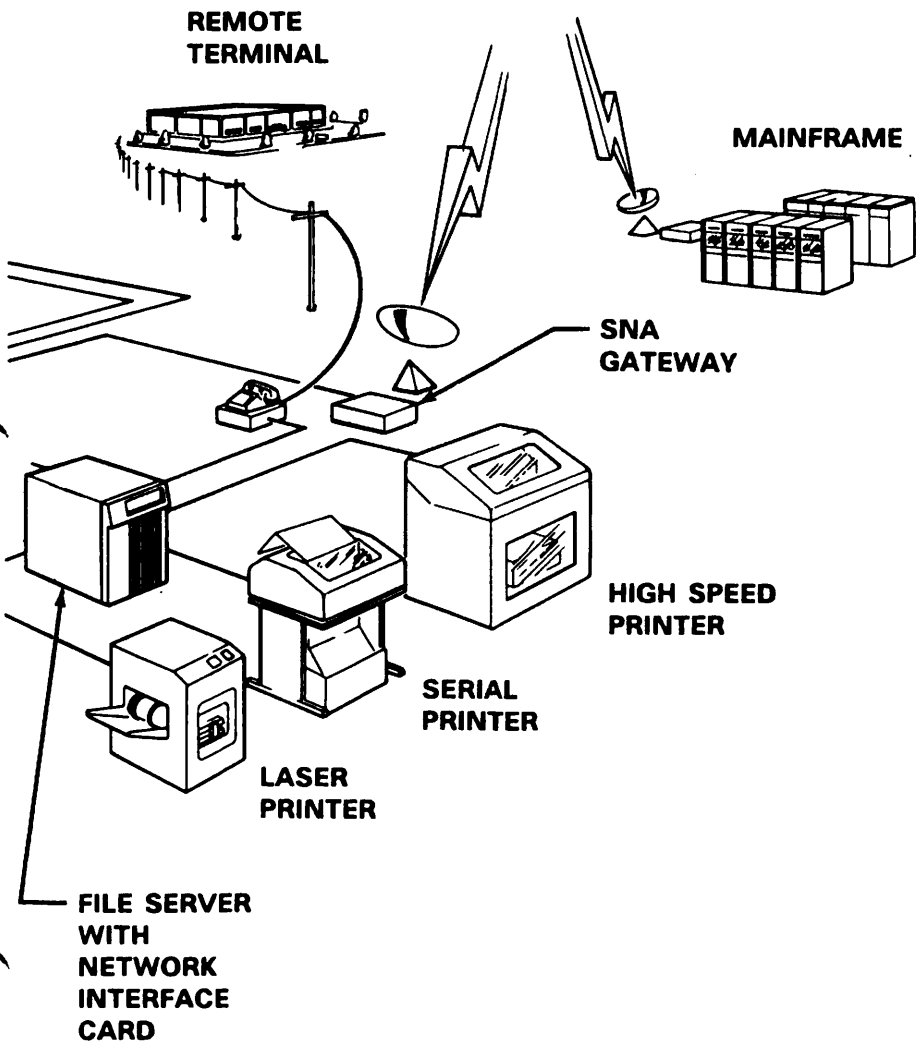
Off-the-shelf software can run at the user's station while major resources are clustered and shared by the community. From their desks users can access data mutually, send printing requests to shared printers, and communicate with each other.

Networked stations are connected in a variety of topologies by coaxial, fiber optic, or IBM Cabling System cable. Some of these stations, called "servers," process network commands and requests. Servers run special software and control mass storage devices, printers, and databases. They also function as communication gateways, connecting networks to mainframes and to each other.

For example, some PLAN networks include one or more file servers that manage the shared use of mass storage on the network.

A PLAN Series Network





Network Components

PLAN Series networks contain

- Up to **255 stations** of various types, either personal computers or servers.
- **Network Interface Cards (NICs)** that link workstations to the network. NICs plug into workstation peripheral slots and control the transmission of data on the network.

NICs, local disk controller cards, and other cards that can reside in a workstation simultaneously, connecting microcomputers to networks and to local peripherals at the same time. NICs transform desktop computers into network workstations without impairing any of their standalone capabilities.

- **Cable and Junction Boxes** (called **HUBs**) that interconnect all workstations. Each HUB contains multiple ports; every station on the network connects to a HUB port using coaxial, fiber optic, or IBM Cabling System cable.

Some HUBS simply split network signals for transmission to other stations. Other HUBS amplify the signal in addition to splitting it. An amplified signal can travel an additional 2000 feet. Using multiple HUBS, workstations can be separated by over four miles (22,000 feet). Up to 255 stations can be supported.

- **User Station Network Software** that supports many personal computer operating systems. At power on, workstations attach to the network. Users can then run programs stored on the network in shared libraries.

A PLAN Series network usually includes at least one **file server** or **multifunction server** consisting of hardware and software that together manage access to attached hard disks. PLAN file servers (models 3000 and 4000) or multifunction servers (model 5000) are specialized units containing the file server processor, a high-density streaming tape unit (used to make disk backups), and a hard disk. To increase disk capacity, additional hard disks can be attached. Multifunction servers may also contain a print server that controls network printers.

Most file server functions are requested and obtained through the network. Some file server functions (such as tape back-up operations) are obtained using an ASCII terminal directly connected to the file server or connected through modems and phone lines to a modem on the file server.

Optional Components

Storage

- **Additional hard disks** can be added to PLAN 4000 and PLAN 5000 file servers to increase storage capacity.
- **Additional file servers** can be added to a network. Multiple file servers can receive and service requests concurrently. In this way virtually unlimited storage, redundancy, and higher performance are available to users.

Servers

In addition to file servers a variety of other types of servers are available. Some are self-contained functional units; others are implemented in software for an IBM PC or Apple //.

- **Print Servers** control network printers processing users' print requests. Print requests issued by users are stored on shared hard disks where print servers find them. Files on the hard disks can be printed, as can output issued by workstations to a "virtual" local printer.

Print server software can run on Print Server Feature Cards installed in the file server, on dedicated IBM PCs and Apple //s, or on the PLAN 1000 print server.

- **File Transfer Servers** transmit data across phone lines linking many network communities.
- **Gateway Servers** link network segments of the same or different protocols.
- **3270 and 3770 servers** link network users to mainframes.
- **Applications Servers** perform special tasks for banks, factories, hospitals, and other organizations. Your installation may have one or more of them.

User Software

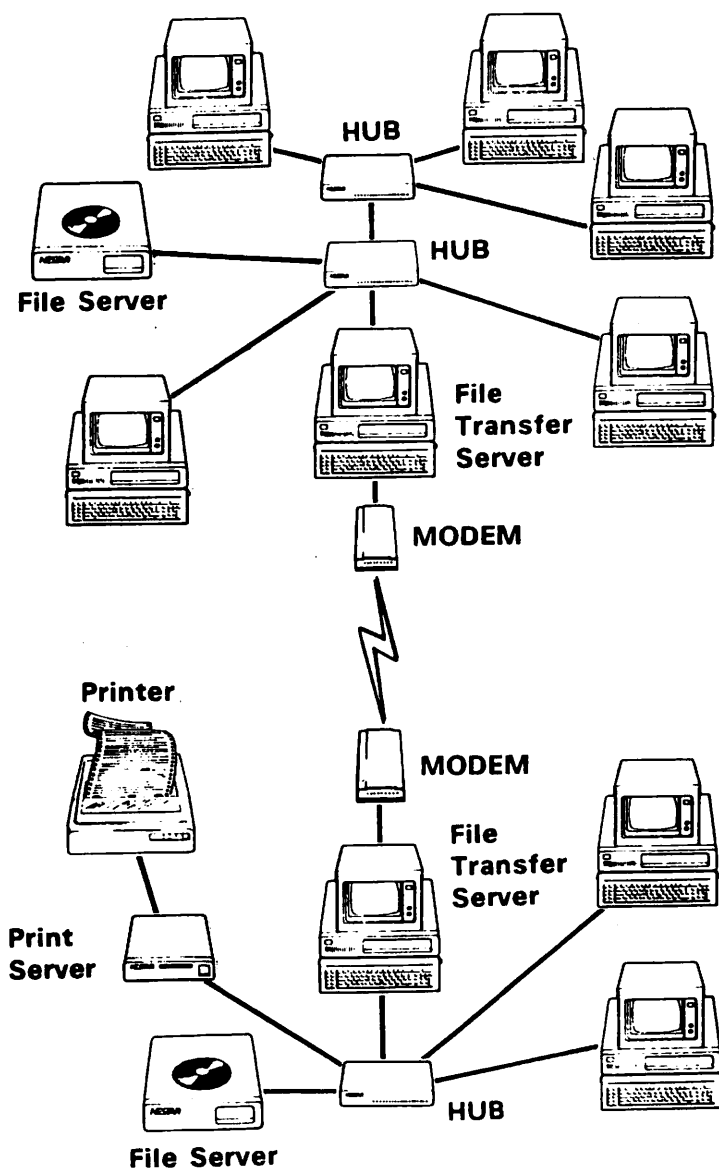
- **PLANPak™**—a set of popular application packages—allows users to run personal computer programs in the shared network environment.

Expanding a Network

There are several ways to expand a network.

- Hubs can be added to extend the distance between stations and groups of stations.
- Multiple file servers can add storage capacity, improve throughput, and increase system availability.
- File Transfer Servers can transmit data across phone lines, connecting local and remote networks with each other by transferring information between them.
- Other servers can be added to enhance network functionality.

HUBs and File Transfer Servers



A Server Example: Request Files

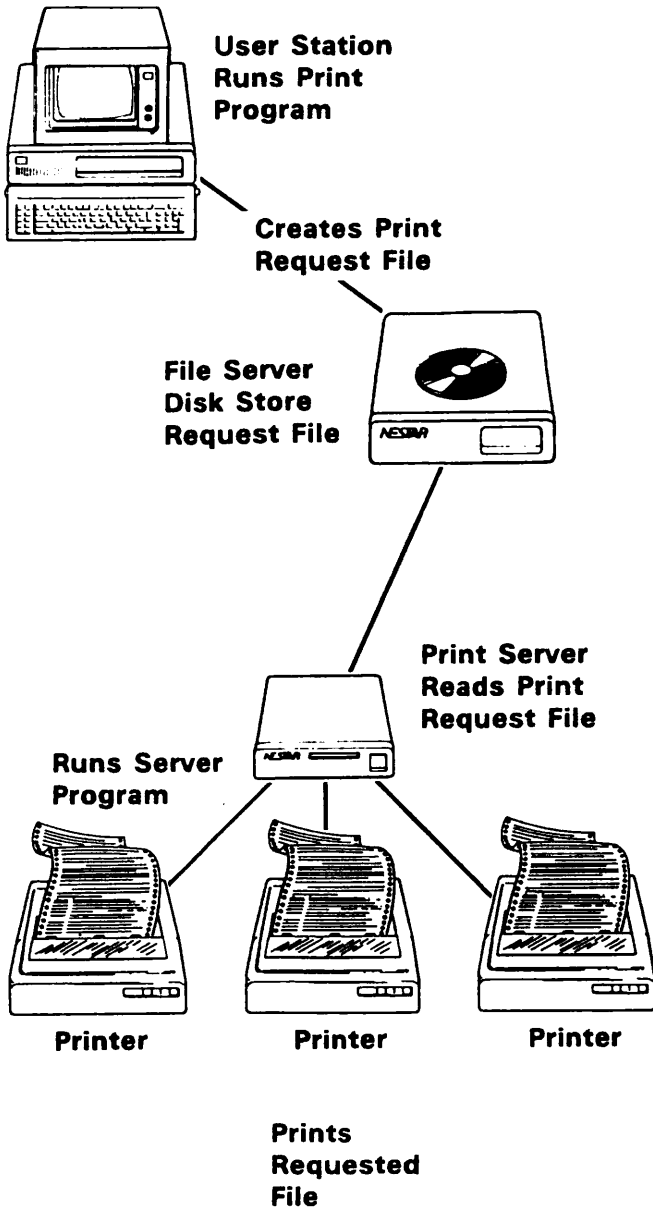
"Request files" are frequently used to allow workstations to obtain server functions. In the figure on the following page, a user runs a print request program on his or her computer. The program creates a request file in shared disk space in a file server on the network.

Print servers periodically check for such request files. When one is found, a server processes it. Requests can specify files to be printed, printer to be used, format, number of copies, priority, and other options. Requests can be handled by any print server on the network or on a connected, remote network if the proper gateways are present.

For this kind of network function, the user need only turn on his or her desktop station, run a print request program, and respond to the prompts that follow.

Alternatively, "virtual print" drivers allow the user to send output to be printed directly into a request file as if it were being sent to a real printer.

Print Request Files

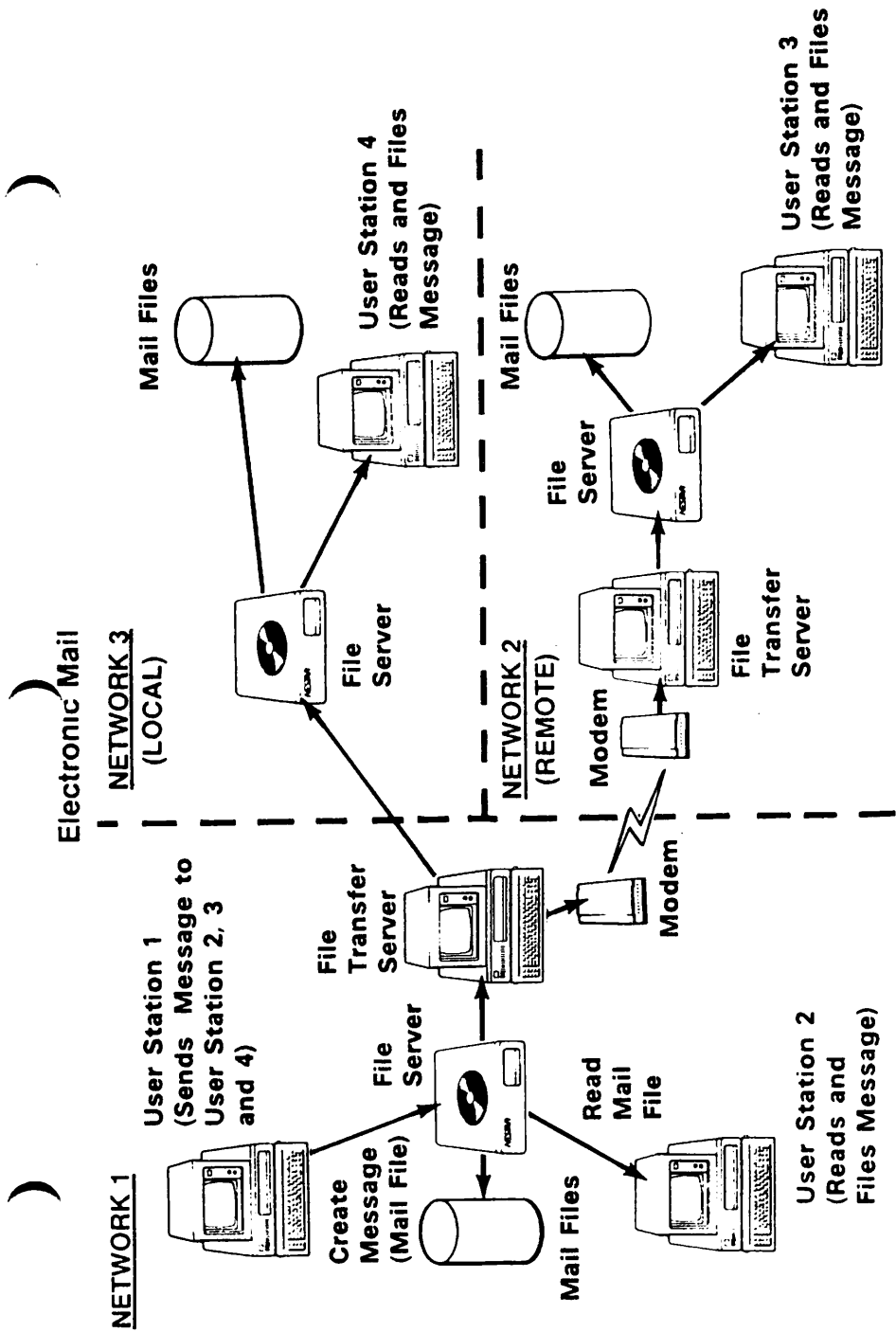


A Communications Example: Electronic Mail

Electronic mail works in much the same way as the network print system. As shown in the following figure, users run a mail program (for example, The Messenger™) at their stations. Guided by prompts, they type in messages that are stored by The Messenger on the shared hard disk managed by a file server.

When users ask to read new mail, The Messenger checks the mail storage areas and displays the stored messages found there.

A full-function mail program allows users to file, forward, print, and otherwise manipulate mail as well as to read and send it to individuals and groups. As with request files, message files can be sent to file servers on other networks, local or remote, if the proper gateways are present.

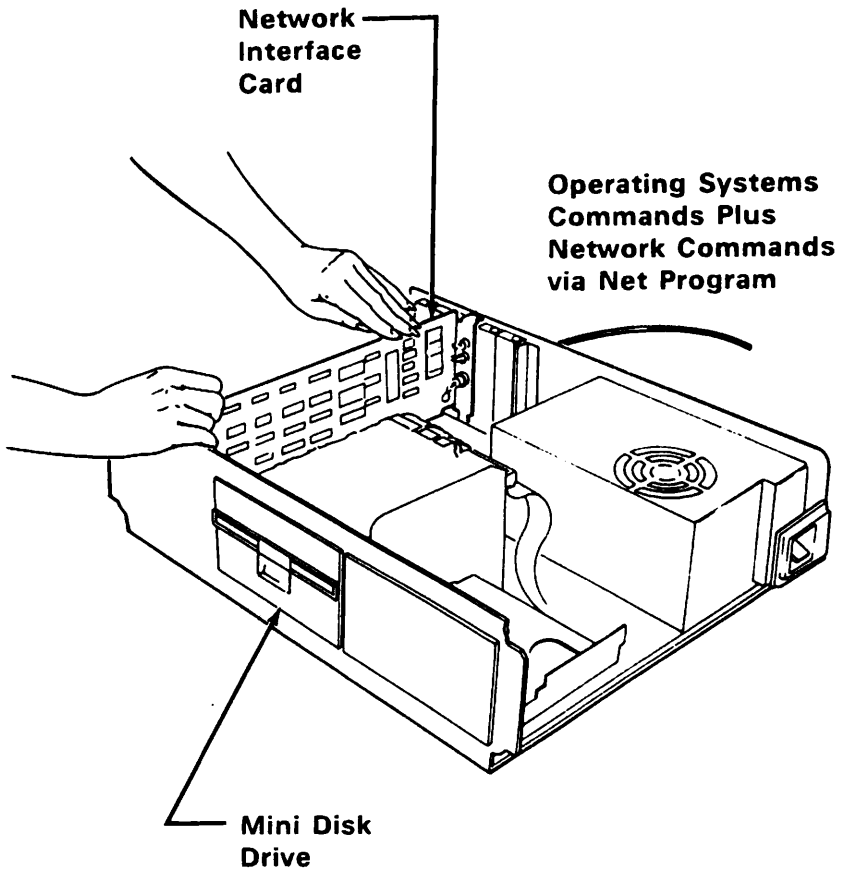


Sharing Hard Disk Storage

PLAN Series systems allow users to share mass storage devices such as hard disks. Specialized stations on the network, called file servers, manage this sharing.

Desktop computers use disk controller cards (hardware) and operating systems (software) to move data to and from floppy disks. To move the same information to and from shared storage, the user communicates with a file server through a network interface card. This network interface card, with the help of network software, acts like a disk interface card (or printer interface card, or modem interface card).

Interface Cards



Virtual Volumes

Network hard disks are organized into directories and files that are used by one or more workstations on the network. These files are called "virtual volumes" or "virtual diskettes" (virtual here means "in essence"). The contents of virtual volumes are formatted to resemble real diskettes so that they can be used with a specific personal computer operating system

Virtual volumes are created by NET, a PLAN user program that issues commands to network file servers. Virtual volumes (diskettes) can contain files of their own in the same way that real diskettes do. The vendor of each personal computer operating system (for example, IBM DOS) provides documentation that explains how to create, delete, and otherwise handle these files. The volumes themselves, being files on network hard disks, are created, deleted, and otherwise handled by the NET program. NET is described in the guides for various operating systems: the *PLAN Series IBM Personal Computer DOS Reference Manual*, the *PLAN Series IBM Personal Computer NCI p-System Reference Manual*, and the *PLAN Series Guide for Apple II Pascal Users*.

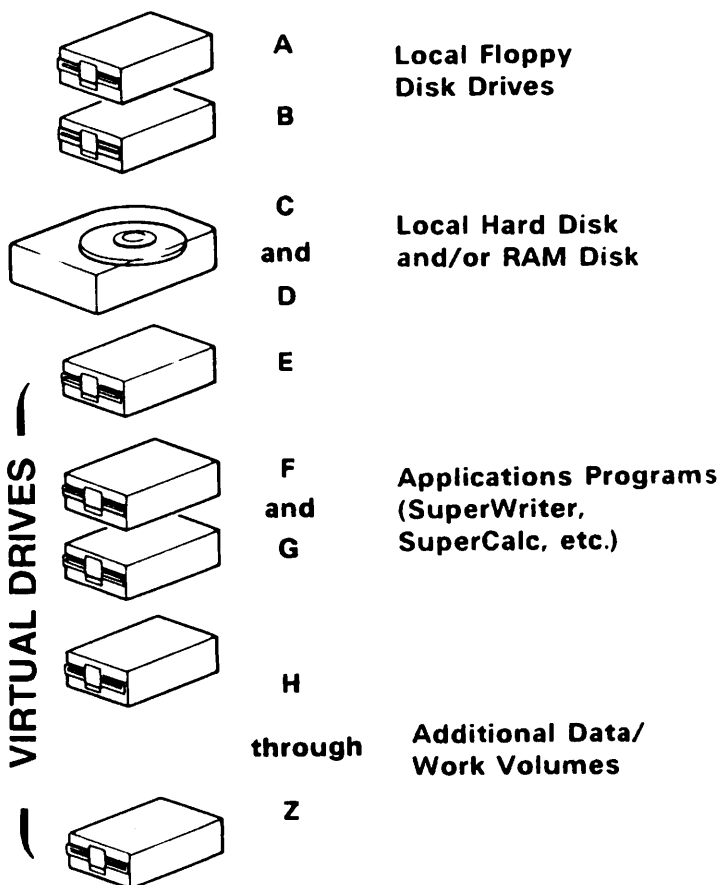
Virtual volumes can be used to start up (boot) a network workstation, operating system, or application in the same way that real diskettes are used to start up standalone computers.

Virtual Drives

Personal computers allow you to attach local disk drives that read data from real diskettes and write data to them.

On the network additional virtual drives are available. As might be expected, virtual volumes are inserted into these virtual drives by a command, issued explicitly by a user at his or her keyboard via the NET program (the MOUNT command) or implicitly from application programs invoking a programmed interface to the NET program.

Virtual Volumes and Virtual Drives



Pathnames

Each virtual volume contains files that are named and used according to the personal computer operating system that created them. The virtual volume itself might also be given a label (name) by the operating system. This name, if present, is the volume's "internal" name.

At the same time, however, virtual volumes are sections of mass storage. As such, they have network names that are unrelated to any volume names held internally. Network names are called "pathnames" (following UNIX filenames terminology).

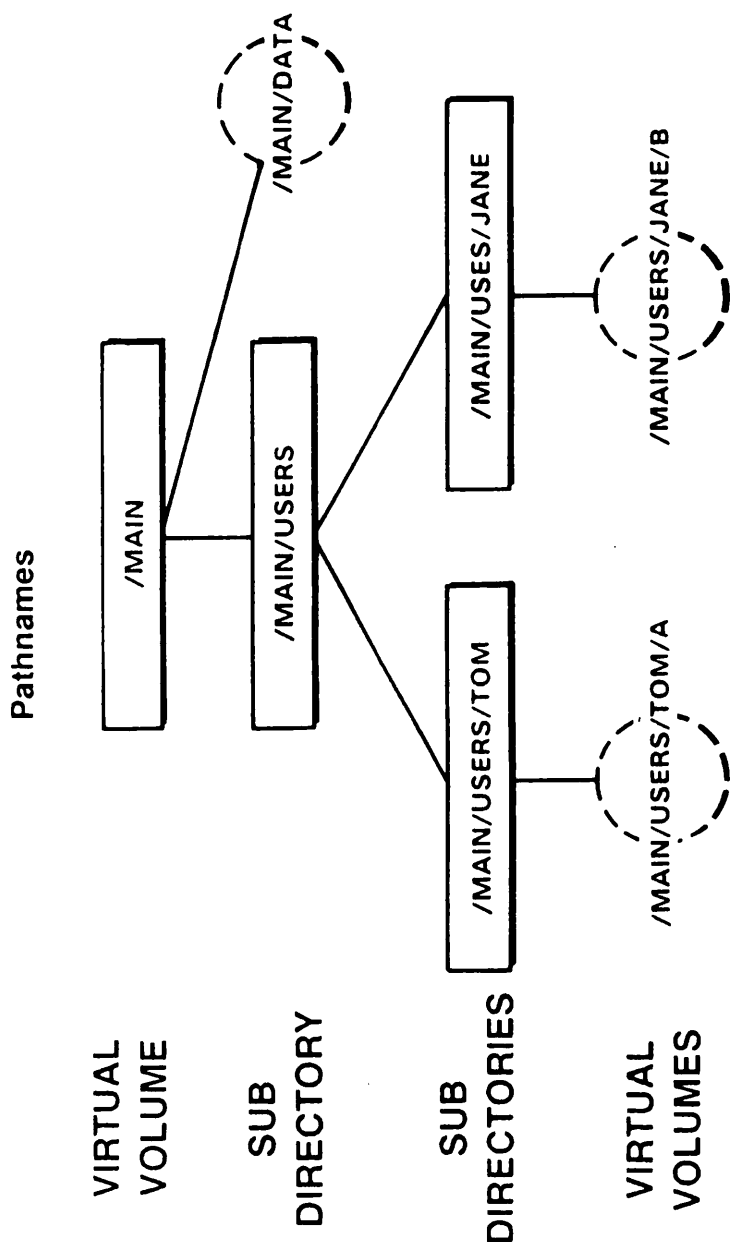
When a virtual volume is created, it is given a pathname. This pathname is used whenever the volume is to be managed by the network. The figure on the following page shows how pathnames are used to identify areas of mass storage.

Network hard disks can be referenced by drive number (1 through 4) or name. In the figure on the next page, the highest level directory on the disk is called /MAIN. This directory contains the names of subdirectories and volumes on the disk. Directories are equivalent to tables of contents.

On /MAIN, network data is stored in a virtual volume called /MAIN:DATA, which is listed in the /MAIN directory. Users' directories, which contain the names of their volumes, are listed in a subdirectory called /MAIN USERS.

Treelike collections of directories and volumes provide a useful means of dividing up large amounts of storage space. By specifying a particular directory, every directory and volume below it can be renamed, deleted, protected, backed up, or otherwise handled without the need for naming explicitly every volume involved.





Network Commands

When a user machine is started, an operating system is usually loaded into it. The user then runs programs and uses operating system commands as needed. The NET program is available to create and handle virtual volumes. From NET, commands are issued to file servers on the network.

At the workstation, real diskettes are inserted into real disk drives. Virtual volumes, however, are "mounted" on virtual drives. The user types in (or a program can issue) a command such as

`MOUNT /MAIN/USERS/TOM/1,B:`

and the virtual volume with the pathname /MAIN/USERS/TOM/1 is made available on drive B. (Commands vary somewhat according to the personal computer operating system being used. In some cases, for example, drives are given numbers rather than letters.)

Commands exist to

`CREATE`
`RENAME`
`MOVE`
`DELETE`

volumes, as well as to

`MOUNT`
`REMOUNT`
`UNMOUNT`

them.

Commands such as

SHOW DRIVES
SHOW INFO
SHOW MOUNTS
SHOW TYPE

provide a variety of information on virtual volumes and network activity.

These and many other commands are described in detail in the *PLAN Series File Server Network Command Reference Manual* and in guides written for each operating system environment.

Security

PLAN Series file servers provide a number of ways to control access to network volumes and directories and to control their usage.

Five types of usage modes are permitted for each volume or directory:

READ WRITE CREATE ERASE DELETE

Access to these usage modes for any volume or directory can be controlled by assigning passwords. A different password can be used to permit each of two arbitrary collections of usage rights (called GROUP and PRIVATE access). A third arbitrary collection of usage rights can be defined for access without a password (called PUBLIC access).

The NET program is used to control access and usage. For example, issuing the command

```
PROTECT /MAIN/DATA/1,  
    PRVPW = GOLD,  
    GRPPW = SILVER,  
    PRVACC= RWCD,  
    GRPACC= RW,  
    PUBACC= R
```

allows the data found in the virtual volume /MAIN/DATA/1 to be read by anyone without a password. Those who know the (group) password SILVER can read and write into the volume. Those who know the (private) password GOLD can read and write into the volume and can delete and erase the volume itself.

The user specifies access and provides passwords when issuing the NET commands of MOUNT, REMOUNT, CREATE, or INIT. For example,

MOUNT /MAIN/DATA/1:GOLD,B:;RW

Here the (private) password GOLD is given and READ/WRITE usage is specified for the data volume to be mounted on drive B:. Since the GOLD password permits READ and WRITE access in the example above, the MOUNT will be performed. If no password (GOLD or SILVER) had been given, only Read access would be allowed, and a MOUNT command that contained RW would not be performed.

A Final Word

Now that you have been introduced to the PLAN Series elements, read the manuals listed on the following pages for more information. Network users will want to read the *PLAN Series Network Command Reference Manual* next. Those who do not yet own a PLAN Series network can contact a Nestar representative for more information.

Contact

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PLAN SERIES PUBLICATIONS

Cardchk Utility Program for the Apple //	LC40-0402
Cardchk Utility Program for the Apple ///	LC40-0403
Cardchk Utility Program and IBM NIC Theory of Operations Manual for the IBM PC	LC40-0404
File Server Apple User's Guides:	
Apple // Pascal	SC40-0501
Apple // DOS	SC50-0502
Apple // CP/M	SC50-0503
Apple /// SOS	SC50-0504
Apple /// CP/M	SC50-0508
File Server Installation and Operation Manual	SC40-0300
File Transfer Server Installation and Operation Manual	SC40-0303
General Index	GA40-0103
General Information Manual	GA40-0100
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IBM Personal Computer NCI p-System Reference Manual	SC40-0509
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Network Installation Manual	GA40-0104

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Print Server User's Manual	SC40-0201
Service Manual	LA40-0400
SNA 3270 Emulator User's Manual	SH40-0206
SNA Gateway Installation and Operation Manual	SH40-0306
Technical Notes	SC40-0100
3270 BSC Emulator User's Manual	SH40-0205
3270 BSC Installation and Operation Manual	SH40-0305
Using the Network: an Introduction for IBM PC DOS Users	SC40-0510

PLANPak Reference Manuals

DATASTORE:LAN User's Manual	SH40-0209
LAN:MAIL MONITOR User's Manual	SH40-0212
SuperCalc3 User's Guide and Reference Manual	SH40-0207
SuperWriter User's Manual	SH40-0208

